

PRINTING METHOD HAVING AUTO RETREAT FUNCTION
OF PRINT DATA AND MEDIUM FOR STORING
PROGRAM FOR EXECUTING THE PRINTING METHOD

5 BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a printing method having an auto retreat function of print data and a medium for storing a program for executing the printing method.

10 Related Background Art

Hitherto, in an information processing system, a mechanism in which when expendable supplies such as papers or the like are absent and an error occurs during the execution of print data, a processing is suspended while processing information including the print data is held and when the expendable supplies are supplemented, the processing can be soon resumed has been provided, thereby improving a working efficiency of the user.

20 For example, it is assumed that papers of the A4 size and A3 size have been set in a printer and print data in which the B5 size was designated as a paper size has been sent from a host (host computer). The printer receives the print data and, at a point when it is detected that the B5 size whose papers are not set
25 has been designated, the printer enters an error status. According to the conventional technique, the

printer does not enter a status where the print data is abandoned and new print data can be processed but suspends the processing while a processing status so far is held and at a point when it is recognized that the expendable supplies have been supplemented, the printer resumes the processing. The user, therefore, can immediately obtain an output by setting papers into the printer. That is, after an error was recognized, the user does not need to perform work for sending the print data again from the host and can efficiently take a proper countermeasure against the error due to the absence of the expendable supplies.

According to the conventional technique, however, since the whole print processing is suspended at a point when the error occurs, not only the processing of the print data in which the error occurred but also the processing of the print data which is waiting to subsequently print is suspended. There is, consequently, a drawback of deterioration in print working efficiency of the other user.

For example, it is assumed that papers of the A4 size and A3 size have been set in a printer in Fig. 5. Print data A in which the B5 size was designated as a paper size is sent from a host A in Fig. 5 and, thereafter, print data B in which the A4 size was designated as a paper size is sent from a host B. In this case, according to the conventional technique, the

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The invention is made in consideration of the above circumstances.

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the data can be normally printed or not on the basis of print attributes of the received print data and a status of the print output apparatus, when it is determined that the data can be normally printed, the printing is executed, and when it is determined that the data cannot be normally printed, the print data is retreated to the memory device in accordance with the setting of the auto retreat, thereby enabling the printing of other print data to be executed.

Another object of the invention is to provide a medium for recording modules for executing the above printing method.

The invention has the medium for recording modules by the above printing method.

The above and other objects and features of the present invention will become apparent from the following detailed description and the appended claims with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a construction of an information processing system to which a print method of an embodiment of the invention is applied;

Fig. 2 is a diagram showing a state where modules are supplied to a host from a medium on which the modules in the embodiment of the invention have been recorded;

Fig. 15 is a flowchart showing a flow of the control in the invention;

Fig. 17 is a flowchart showing a flow of the control in the invention; and

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Embodiments of the invention will now be described with reference to the drawings.

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15 The following description will be made on the
assumption that the printer in Fig. 5 has a storage
which can perform a retreat processing of print data in
response to a request from a host (computer) as a
prerequisite. A connecting style of the hosts and the
20 printer is also similarly applied to a style in which
the hosts and the printers are connected in a one-to-
one connecting relational manner or a style in which
the printer is connected to a print server as shown in
Fig. 6. For example, it is assumed that only the
25 papers of the A4 size and the A3 size have been set in
the printer in Fig. 5 and the printer is in a status
where there is no staple although the printer has a

stapling function.

Modules which realize a main body of an apparatus have been installed in a disk 1033 in a storage 1030 of a host 10 in Fig. 1. It is assumed that when the host 10 is activated, the modules which realize the invention are read into an RAM 1031 in the storage 1030 in Fig. 1 and executed. The modules which execute the invention are program codes converted on the basis of flowcharts shown in Figs. 14 to 18.

The modules realizing the invention and the related data can be also loaded into the host 10 from a memory medium reader 1050 of the host 10 and executed. It is assumed that the modules realizing the invention and the related data have been recorded on a recording medium 20020 in Fig. 2 and have a recording construction as shown in Fig. 4. In this case, the modules realizing the invention and the related data recorded on the recording medium 20020 can be loaded into the host 10 via a memory medium reader 20010 in Fig. 2.

When the recording medium 20020 is set into the memory medium reader 20010 of the host 10, the modules realizing the invention and the related data are read out of the recording medium 20020 under the control of the OS and a basic I/O program, is loaded into the RAM in the storage 1030 of the host 10, and can be operated. Fig. 3 shows a memory map in a state where

The modules realizing the invention and the related data recorded on the recording medium 20020 in Fig. 2 can be temporarily stored (installed) into the disk 1033 or the like in the storage 1030 of the host 10 and can be loaded into the RAM 1031 in the storage 1030 of the host 10 from the disk 1033 or the like in the storage 1030 of the host 10 each time the modules realizing the invention and the related data are made operative.

The description of the invention is further made
on the assumption of the following points as a
prerequisite.

That is, an auto retreat information table showing an error which can automatically retreat as shown in Fig. 13 has been stored in a disk 2033 in a storage 2030 of the printer in Fig. 1. The auto retreat information table can be stored on the disk 1033 in the storage 1030 of the host 10 and can be downloaded into the printer when the host is activated.

The invention will now be described on the assumption of the above points.

First, a flow of processing of the host A in Fig. 5 will be described. First, the user designates a printing method in the host A in Fig. 5 and allows a display of the host A to display a print dialog (Fig. 7) of software (printer driver or the like) for making print data. In the example of Fig. 7, as attributes of the print data whose processing is started from now on, an all-page printing mode is designated by clicking a button 701 and the number of copies (namely, "1") is designated by clicking a button 702. An auto retreat flag is "set" by clicking a button 703. A paper size is set to "A4" by clicking a button 704. A stapling is set to "NO" by clicking a button 705. A single-sided printing or the like is set by clicking a button (double-sided) 706 to "NO". The user selects a "print" button 707 in the print dialog, so that a controller 1010 of the host in Fig. 1 starts a print processing (step 1401) shown in Fig. 14.

Reference numeral 708 denotes a "cancel" button of the printing. As mentioned above, the user can set whether the auto retreat is permitted or not on a print job unit basis on the display of the host.

The controller 1010 receives a print request from application, forms print data "TEST-1", and temporarily stores it into the RAM 1031 in the storage 1030 of the

host (step 1402). In the embodiment, it is assumed that the controller 1010 obtains the print data from the OS or application at this time point and temporarily stores it into the disk 1033 in the storage 1030 of the host 10. The print data can be successively obtained from the OS or application at a necessary time point.

The controller 1010 subsequently sets the auto retreat flag to the print data "TEST-1" stored in the RAM 1031 in the storage 1030 (step 1403).

The controller 1010 sends the print data "TEST-1" stored in the RAM 1031 in the storage 1030 to the printer as shown in Fig. 5 (step 1404). Actually, the controller 1010 transfers the print data "TEST-1" to a controller 2010 of the printer via a connector 1020 of the host 10 and a connector 2020 of a printer 20 in Fig. 1. At this time point, the print data "TEST-1" sent from the host A has been sent as shown in Fig. 9.

A flow of processing (refer to Fig. 15) in the printer in Fig. 5 will now be described.

The controller 2010 of the printer discriminates whether the print data has been received from the host or not (step 1501).

The controller 2010 of the printer subsequently determines that it received the print data from the host because the print data "TEST-1" has been received, and temporarily stores the print data "TEST-1" into an

The controller 2010 of the printer subsequently inputs (updates) information (item of No. 1 in Fig. 11A) of the print data "TEST-1" into job execution management tables (Figs. 11A to 11F) which exist in the RAM 2031 in the storage 2030 of the printer and are used to manage the print processing (step 1503).

The controller 1010 discriminates whether any notice has been received from the printer or not (step 1405). Since no notice is received from the printer at this time point, the controller 1010 determines that no
15 notice is received.

A flow (refer to Fig. 15) of processing of the
25 printer in Fig. 5 will now be described.

The controller 2010 of the printer discriminates whether an inquiry has been received or not (step

1504). In this case, since the control data to obtain
the status of the print data "TEST-1" has been received
from the host A, the controller determines that the
inquiry has been received. The controller 2010 of the
5 printer analyzes the received control data and checks
the control contents (step 1505). In the embodiment,
since the control data is the control data to obtain
the status of the sent print data "TEST-1", the
controller 2010 of the printer analyzes the job
10 execution management data stored in the RAM 2031 in the
storage 2030 of the printer as shown in Figs. 11A to
11F. As a result of the analysis, the controller 2010
of the printer recognizes that the status of the
relevant print data indicates that the data is being
15 printed, and replies about the information to the
controller 1010 via the connector 2020 of the printer
and the connector 1020 of the host (step 1506).

A flow (refer to Fig. 14) of processing of the
host A in Fig. 5 will now be described.

20 On the basis of the information replied in step
1407, the controller 1010 determines that the
processing of the print data "TEST-1" is not completed.
The processing routine is returned to step 1405.

25 A flow (refer to Fig. 15) of processing of the
printer in Fig. 5 will now be described.

The controller 2010 of the printer checks job
retreat management tables as shown in Figs. 12A to 12C

stored in the RAM 2031 in the storage 2030 of the printer in order to discriminate the presence or absence of a retreated job (step 1507). Since no information exists in the job retreat management tables
5 at this time point, it is determined that the automatically retreated job does not exist.

The controller 2010 of the printer subsequently checks the job execution management tables as shown in Figs. 11A to 11F stored in the RAM 2031 in the storage
10 2030 of the printer in order to discriminate the presence or absence of a print-waiting job (step 1508). Since the information of the print data "TEST-1" has been inputted at this time point in step 1503, it is determined that the print-waiting job exists.

15 It is assumed that the processing in steps 1401 to 1404 was executed in the hosts A and B after that and the printing was performed in the following order: namely, print data "SAMPLE-B" (attributes in which an auto retreat flag is turned "ON", a paper size is set
20 to "B4", a stapling is set to "NO", a printing mode is set to "single-sided printing", and the like) from the host B; print data "TEST-2" (attributes in which the auto retreat flag is turned "ON", the paper size is set to "A4", the stapling is set to "NO", the printing mode
25 is set to "single-sided printing", and the like) from the host A; and print data "SAMPLE-C" (attributes in which the auto retreat flag is turned "ON", the paper

size is set to "A3", the stapling is set to "YES", the printing mode is set to "single-sided printing", and the like) from the host B. Thus, the total four print data is held as execution jobs in the printer in Fig. 5 and it is assumed that the status in the printer is as shown in Fig. 9 and the job execution management table is as shown in a state of Fig. 11A.

Subsequently, the controller 2010 of the printer analyzes the print attributes of the head print data in the job execution management data stored in the RAM 2031 in the storage 2030 of the printer in order to start the processing of the print-waiting job (step 1601). Specifically speaking, the print attributes of the print data "TEST-1" are obtained.

Subsequently, the controller 2010 of the printer analyzes the status of the printer (step 1602). Specifically speaking, the size of paper set at present is checked, whether the papers of such a size exist or not is discriminated, and whether the other expendable supplies are absent or not are discriminated.

Subsequently, the controller 2010 of the printer discriminates whether the print data "TEST-1" can be normally printed or not (an error occurs or not) by collating the results in steps 1601 and 1602 (step 1603). In this case, since the print data "TEST-1" designates the paper size A4 of the papers which are set at present and the other print attributes are also

proper, the controller 2010 of the printer determines that the print data "TEST-1" can be normally printed (no error occurs).

Subsequently, the controller 2010 of the printer discriminates whether the whole print processing of the print data which is at present being executed has been completed or not (step 1606). In this case, since the print data which is not processed yet exists, the controller 2010 of the printer determines that the whole print processing is not completed yet.

After that, the processing in steps 1501 to 1508 and the processing in steps 1601 to 1608 shown in Fig. 16 are repeated and the controller 2010 of the printer
25 determines that the whole print processing has been completed (step 1606).

deletes the print data whose processing has been finished from the RAM 2031 in the storage 2030 of the printer (step 1607). The controller 2010 updates (deletes) the information of the job (print data "TEST-1") of No. 1 in the job execution management table (A) as shown in Fig. 11A, so that the job execution management data changes as shown in Fig. 11B. The processing routine is returned to step 1501.

In order to start the processing of the print-waiting job, the controller 2010 of the printer analyzes the print attributes of the head print data in the job execution management table stored in the RAM 2031 in the storage 2030 of the printer (step 1601). Specifically speaking, the print attributes of the print data "SAMPLE-B" is obtained.

Subsequently, the controller 2010 of the printer analyzes the status of the printer (step 1602). Specifically speaking, the size of paper set at present is checked, whether the papers of such a size exist or not is discriminated, and whether the other expendable supplies are absent or not are discriminated.

Subsequently, the controller 2010 of the printer discriminates whether the print data "SAMPLE-B" can be normally printed or not (an error occurs or not) by collating the results in steps 1601 and 1602 (step 1603). In this case, since the print data "SAMPLE-B" designates the paper size B5 of the papers which are

not set at present, the controller 2010 of the printer determines that the print data "SAMPLE-B" cannot be normally printed (an error occurs).

If the auto retreat flag is not set in the print data "SAMPLE-B", an operation similar to that in the conventional apparatus is executed. The whole processing is temporarily suspended, the print processing is resumed at a point when the user supplements the expendable supplies, and an output can be soon obtained. Specifically speaking, the controller 2010 of the printer suspends the print processing (step 1615).

When it is determined that the cause of the error is not removed, the controller 2010 of the printer discriminates whether the cancel of the print data has been instructed or not (step 1617). When the controller 2010 of the printer determined that the cancel of the print data has been instructed, step 1607

Subsequently, the controller 2010 of the printer
5 updates the information in the job retreat management
table stored in the RAM 2031 in the storage 2030 of the
printer (step 1613). Specifically speaking, the
information of the print data "SAMPLE-B" is inputted
and the job retreat management table changes as shown
0 in Fig. 12A.

20 A flow of processing (refer to Fig. 14) of the
host A in Fig. 5 will now be described.

The controller 1010 discriminates whether some notice has been received from the printer or not (step 1405). At this time point, it is decided that the notice has been received from the printer, and the controller 1010 analyzes the contents of the notice and displays them to a display 1040 of the host (step

5 A flow of processing (refer to Fig. 16) of the
printer in Fig. 5 will now be described.

15 In this instance, although an error occurred in
the print job "SAMPLE-B" and the processing was
suspended, by automatically retreating the print data,
the printer can be set into a status where the
processing of the next print data can be started. That
20 is, even if the error occurred in the print data
"SAMPLE-B", an influence that is exerted on the next
print-waiting print job "TEST-2" (in other words, the
processing of this job is made to wait) can be avoided.

Subsequently, the controller 2010 of the printer
25 executes the processing in steps 1501 to 1507. Since
the information of the print data "SAMPLE-B" has been
inputted into the job retreat management data at this

checks the job execution management table as shown in Figs. 11A to 11F stored in the RAM 2031 in the storage 2030 of the printer to see if the print-waiting job exists (step 1508). Since the information of the print data "TEST-2" and "SAMPLE-C" has been inputted at this time point, the print-waiting job is determined to be present.

Subsequently, the controller 2010 of the printer analyzes the print attributes of the head print data in the job execution management table stored in the RAM 2031 in the storage 2030 of the printer in order to start the processing of the print-waiting job (step 1601). Specifically speaking, the print attributes of the print data "TEST-2" are obtained. Since the print attributes of the print data "TEST-2" indicate that no error occurs, the processing in steps 1501 to 1508, the processing in steps 1601 to 1608, and the processing in 1701 to 1703 are repeated, so that the whole print processing is completed.

The controller 2010 of the printer updates the information in the job execution management table stored in the RAM 2031 in the storage 2030 of the printer (step 1608). Specifically speaking, the information of the print data "TEST-2" whose print processing has been completed is deleted and the job execution management table changes as shown in Fig. 11D. The processing routine is returned to step 1501.

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Subsequently, the controller 2010 of the printer suspends the print processing of the print data

Subsequently, the controller 2010 of the printer stores the print data "SAMPLE-C" into the disk in the storage 2030 of the printer (step 1612).

Subsequently, the controller 2010 of the printer updates the information in the job retreat management table stored in the RAM 2031 in the storage 2030 of the printer (step 1613). Specifically speaking, the information of the print data "SAMPLE-C" is inputted and the job retreat management table changes as shown in Fig. 12B.

Subsequently, the controller 2010 of the printer notifies the host of the fact that the print processing of the job has been suspended and the print data has been retreated (step 1614). Specifically speaking, the cause of the suspension and the information indicating that the print data has been retreated are sent to the controller 1010 via the connector 2020 of the printer and the connector 1020 of the host B as an owner. The information is displayed on the display 1040 in the host B.

The controller 2010 of the printer updates the information in the job execution management table held

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2030 of the printer in order to confirm whether the processing of the retreated job can be resumed or not (step 1701). Specifically speaking, the print attributes of the print data "SAMPLE-B" and "SAMPLE-C" are obtained.

Subsequently, the controller 2010 of the printer analyzes the printer status (step 1702). Specifically speaking, the size of paper set at present is checked, whether the papers of such a size exist or not is discriminated, and whether the other expendable supplies are absent or not are discriminated.

Subsequently, the controller 2010 of the printer discriminates whether the print data "SAMPLE-B" and "SAMPLE-C" can be normally printed or not (whether the print processing can be resumed or not) by collating the results in steps 1701 and 1702 (step 1703). In this case, since the papers of the paper size B5 necessary for printing have been set only for the print data "SAMPLE-B", the controller 2010 of the printer determines that the print data can be normally printed (print processing can be resumed).

Subsequently, the controller 2010 of the printer restores (copies) the print data "SAMPLE-B" stored in a memory device in the storage 2030 of the printer into the RAM 2031 in the storage 2030 of the printer. The controller 2010 of the printer deletes the print data "SAMPLE-B" stored in the memory device in the storage

2030 of the printer (step 1704).

Subsequently, the controller 2010 of the printer updates the information in the job retreat management table stored in the RAM 2031 in the storage 2030 of the printer (step 1705). Specifically speaking, the information of the print data "SAMPLE-B" is deleted, so that the job retreat management table changes as shown in Fig. 12C.

Subsequently, the controller 2010 of the printer updates the information in the job execution management table stored in the RAM 2031 in the storage 2030 of the printer (step 1706). Specifically speaking, the information of the print data "SAMPLE-B" whose print processing was resumed is inputted and the job execution management table changes as shown in Fig. 11E. The processing routine advances to step 1508.

After that, the controller 2010 of the printer repeats the processing in steps 1501 to 1508 and the processing in steps 1601 to 1608 and outputs the print data "SAMPLE-B". The controller 2010 of the printer determines that the whole print processing has been completed in step 1606.

It is assumed that the user has set the staples into the printer in this status. The controller 2010 of the printer executes the processing in steps 1501 to 1507. At this time point, since the information of the print data "SAMPLE-C" has been inputted into the job

Subsequently, the controller 2010 of the printer
5 analyzes the print attributes of the print data in the
job retreat management table held in the RAM 2031 in
the storage 2030 of the printer in order to confirm
whether the processing of the retreated job can be
resumed or not (step 1701). Specifically speaking, the
0 print attributes of the print data "SAMPLE-C" are
obtained.

Subsequently, the controller 2010 of the printer discriminates whether the print data "SAMPLE-C" can be normally printed or not (whether the print processing can be resumed or not) by collating the results in steps 1701 and 1702 (step 1703). In this case, since the staples necessary for printing the print data "SAMPLE-C" have been set, the controller 2010 of the printer determines that the print data can be normally printed (print processing can be resumed).

Subsequently, the controller 2010 of the printer

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A message indicating that all of the printable jobs have already been completed (deleted) in the printer status at that time point can be notified to the host as an owner of the retreated job and displayed
5 before the retreated job is executed.

(Embodiment 2)

As an embodiment 2, it is possible to improve a method of taking a countermeasure against the resume of the printing of the retreated print data.

10 In the embodiment 1, the user actually supplements the expendable supplies, thereby allowing the print attributes to be satisfied and allowing the print processing of the retreated print data to be automatically resumed.

15 According to the embodiment 2, a utility for changing the print attributes of the print data which was retreated and held in the printer from the host by a remote operation is provided. By this utility, the print attributes in which an error occurs are changed
20 so as to be adapted to the present printer status, thereby allowing the print processing to be resumed. Specifically speaking, the utility having a user interface as shown in Fig. 10 is provided and processing in steps 1801 to 1804 is executed.

25 It is now assumed that the print job "SAMPLE-C" has been retreated as shown in the job retreat management table in Fig. 12C.

5 Subsequently, the controller 1010 of the host displays the information of the retreated job in the printer onto the display 1040 in a form as shown in Fig. 10 on the basis of the information obtained from the printer (step 1802).

For example, it is assumed that the user changed
15 the item "stapling" in Fig. 10 from "YES" to "NO". In
this case, the controller 1010 of the host determines
that the user instructed to change the print attributes
of the job, so that it sends control data for changing
the print attributes to the printer (step 1804). Thus,
20 no error occurs in the print data "SAMPLE-C" and the
print processing is restarted.

By the above operation, the print processing of the print data which was retreated and held can be easily resumed from a remote place. Even if the various component elements described as examples in the foregoing embodiments are replaced with the following component elements, they will be valid.

Printer..... Plotter, copying apparatus, facsimile,
etc.

Host..... Personal computer, workstation,
minicomputer, etc.

5 Controller.. Software, ROM, RAM, etc.

Connector... Serial interface board, parallel
interface board, network interface
board, etc.

Storage..... Memory, magnetic disk device,
10 magneto optic disk device, magnetic
tape device, etc.

Printer..... Laser beam system, bubble jet system,
LED system, thermal transfer system,
etc.

15 Display..... CRT, LCD, etc.

Input unit.. Keyboard, mouse, track ball, etc.

Memory medium reader.. FD device, MO device, CD-ROM
device, IC memory card device, etc.

Recording medium.. FD, MO, CD-ROM, IC memory card,
20 etc.

As described above, according to the printing
method and medium of the invention, there is such an
effect that when an error occurs due to the cause of
25 absence of the expendable supplies, by automatically
retreating and holding the print data, the
deterioration of the working efficiency of the print-

There is also such an effect that the resources of the shared memory device and the like of the printer are utilized and the working efficiency is improved.

- 5 There are such effects that the print processing
of the print data which was retreated and held can be
easily resumed from a remote place and a using
efficiency is improved.